

## ABSTRACT

A conductive oxygen barrier layer is formed on an interlayer dielectric film and patterned such that it is in contact with the top surface of a contact plug to prevent the diffusion of oxygen into the contact plug from above. The conductive oxygen barrier layer is composed of a lower layer containing a conductive nitride such as TiAlN, and an upper layer containing a conductive oxide such as IrO<sub>2</sub>. An insulative oxygen barrier layer composed of Al<sub>2</sub>O<sub>3</sub> and having a thickness of approximately 20nm is formed on the side surfaces of the conductive oxygen barrier layer to prevent the diffusion of oxygen into the contact plug from the sides, such as from the sides of the lower layer of the conductive barrier layer.

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